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Effect of using fermented date stone powder with Iraqi probiotic feed on some blood parameters of ISA Brown laying hens

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Abstract

This study was conducted in the poultry field, Department of Animal Production, College of Agriculture, Al-Muthanna University, for a period of 84 days, to study the effect of partial replacement of fermented date seed powder with the Iraqi probiotic instead of barley to the diet, on some productive and egg qualitative trait of laying hens. A total of 75 laying hens ISA Brown, 43 weeks age type were used, were randomly distributed among 5 treatments with 3 replicates, (5 birds each replicate). The treatments were as follows; T1: (control treatment). T2, T3, T4 and T5 were replacing the fermented date seeds powder with the Iraqi probiotic by 25, 50, 75 and 100% instead the barley to the diet, respectively. There was a significant decrease (P≤0.05) on some biochemical blood plasma parameters of laying hens (concentrations of glucose, cholesterol and triglycerides), when measuring at the age of 54 weeks of age of laying hens, while the significant differences appear when the measurement at the age of 43 weeks, with a significant decrease (P≤0.05) on total protein, albumin, and globulin when the measurement was performed at the age of 54 weeks, while there were no significant differences for these traits when measuring these traits at the age of 43 weeks.

Keywords: Fermented, date stone powder, Iraqi probiotic, blood parameters, ISA Brown, laying hen.

Introduction:

The intense genetic selection of domestic birds in general, as laying hens produced strains characterized by high egg production (Al-Gharawi and Ebade, 2020). Accompanied by a development in the cultural, health and economic level, as well as a change in social behavior (Al-Gharawi *et al*., 2018). Which led to an increase in the demand for poultry products such as eggs and meat, as a result, many requirements have increased, must keep pace with the development taking place in the breeds of laying hens, including the nutritional requirements, as the nutrition factor is one of the main important factors in poultry projects, it constitutes about 60-70% of the amounts for establishing poultry projects, poultry nutritionists have received great attention, by searching for alternative means of traditional fodder (Al-Gharawi *et al*., 2017; Al-Gharawi *et al*., 2023).

Which is characterized by its high prices, which cost the state in hard currency, because most of them are imported from outside the country, on the one hand, in addition to losing them from the global markets, as a result of the events in the countries producing this feed on the other hand, therefore, there was a need to use feed alternatives as leftovers in the local markets, which is characterized by low prices and availability in the required quantities, it is produced as by-products of many food industries or grain processing plants, such as waste from the molasses industry, such as date stones, the date cores constitute between 5-15% of the weight of the produced dates, reached more than 17 million palm trees in 2014, especially in the southern regions, and the amount of production of dates in Iraq amounted to about 662 thousand tons annually (Arab Organization for Development and Agriculture, 2015). Dates are often used as a supplement to traditional diets used to feed large animals and poultry, Date stones contain many amino and fatty acids, many effective flavonoid compounds, saponins, tannins, and many mineral elements (Ibrahim, 2008).

The current study aims to investigate the effect of crushed date seeds fermented with the

Iraqi probiotic on some blood traits in laying hens.

Materials and Methods

This study was conducted at the Agricultural Research Station of Al-Muthanna University, College of Agriculture, from 15 October, 2022 to 7 January, 2023, for a period of 12 weeks, to studied the effect of using date seed powder fermented with the Iraqi probiotic in the diet on the weight and mass of eggs.

In the experiment, 75 laying hens of Brown ISA strain were used, the birds were prepared from the poultry field located in the station of agricultural research and experiments, the College of Agriculture, Al-Muthanna University, at the age of 41 weeks. It was randomly distributed among five treatments, and each treatment consisted of three equal replicates, each replicate contains 5 laying hens (15 laying hens/treatment). The experimental treatments were as follows:

T1: The first treatment: (control treatment).

T2: Replacing the fermented date seeds powder with the Iraqi probiotic by 25% instead the barley to the diet.

T3: Replacing the fermented date seeds powder with the Iraqi probiotic by 50% instead the barley to the diet.

T4: Replacing the fermented date seeds powder with the Iraqi probiotic by 75% instead the barley to the diet.

T5: Replacing the fermented date seeds powder with the Iraqi probiotic by 100% instead the barley to the diet.

Table 1. The chemical composition of the diets used and the chemical analysis during the experiment period 12 weeks

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Items	T1	T2	T3	T4	T5
Maize	37.5	37.5	37.5	37.5	37.5
Barley	10	7.5	5.0	2.5	0
Date seed powder	0	2.5	5.0	7.5	10
Wheat	10	10	10	10	10
Soybean meal	23	23	23	23	23

Oil	2.5	2.5	2.5	2.5	2.5
Salt	0.5	0.5	0.5	0.5	0.5
Premix	2.5	2.5	2.5	2.5	2.5
Limestone	8.0	8.0	8.0	8.0	8.0
Total	100	100	100	100	100
Chemical Analysis					
Metabolize energy (kcal/ kg)	3493	2789.25	2785.5	2781.75	2778
Protein (%)	17.11	17.054	16.998	16.926	16.854
Fiber (%)	4.42	4.71	4.95	5.19	5.43
Calcium (%)	3.15	3.15	3.15	3.15	3.15
Available phosphorus	0.440	0.442	0.444	0.446	0.448
Methionine	0.46	0.462	0.464	0.46	0.466
Lysine	0.841	0.843	0.845	0.847	0.849

Results and discussions:

Table (2) shows the effect of using fermented date stone powder with the Iraqi probiotic, instead of barley in the diet in the blood chemical traits of laying hens, such as glucose, cholesterol and triglycerides, there were no significant differences in the glucose concentration in the blood of laying hens when measuring at the age of 43 weeks, while the differences were significant ($P\leq0.05$) when measuring blood sugar at the age of 54 weeks for chickens, as the sugar concentration was high and significantly in T1 and T2 compared to the rest of the treatments in the experiment, with a significant differences among T3, T4 and T5. The increase was significant in favor of the treatments in which the percentage of date seed powder fermented with the Iraqi probiotic replaced barley in the diet decreased, while it was observed that the concentration of sugar in the blood decreases with the increase in the percentage of fermented date seed powder in the diet.

As for the cholesterol concentration, no significant differences appeared between the treatments in the experiment when the measurement was made at the age of 43 weeks for laying hens, while the difference was significant ($P\leq0.05$) when measuring at the age of 54 weeks. The concentration of cholesterol decreased with the increase of date seed powder in the diet, as there were no significant differences among T3, T4 and T5, while the concentration was high and significant in T1 compared to T2, the concentration of cholesterol decreased significantly with an increase in the proportion of powdered date seeds fermented

with the Iraqi probiotic in the diet.

As for the concentration of triglycerides, there were no significant differences when measuring at the age of 43 weeks between all treatments in the experiment, while there were significant differences (P≤0.05) in the concentration of triglycerides when measuring at the age of 54 weeks, the triglycerides were significantly high in T1 compared to T4 and T5, a significant differences among T1, T2 and T3 in the concentration of triglycerides, the differences were not significant between T4 and T5. The results of this study were inconsistent with the findings of Masoudi *et al.* (2013), who noticed the appearance of a significant increase in the concentration of sugar glucose with an increase in the level of date stone powder in the diet of laying hens in separate studies. Abdulameer and Attia (2013) show that a significant differences in the concentration of sugar in the blood of laying hens, who was fed on a diet containing powdered date stones Eve, treated or not treated with enzymes, compared to the concentration of glucose in the blood of laying hens, who ate fodder free from date seed powder, this variation in the blood sugar concentration of chickens may be due to the results of the studies, to the different proportions of date stone powder used in diets.

Table (2) Effect of using date seed powder fermented with the Iraqi probiotic in the diet on glucose, cholesterol and triglycerides during the production weeks (43-54 weeks).

Treatments	Glucose (gm/ 100 ml blood)		Cholesterol (gm/ 100 ml blood)		Triglycerides (gm/ 100 ml blood)	
	43 weeks	54 weeks	43 weeks	54 weeks	43 weeks	54 weeks
T1	0.051±207.75	0.057±207.13 a	0.461±295.11	0.184±278.30 a	0.057±142.81	0.034±143.50 a
T2	0.346±207.650	0.086±207.003a	0.456±296.20	0.150±277.10 b	0.346±142.98	0.057±143.41 ab
T3	0.479±208.303	0.057±206.51 b	0.519±298.11	0.043±276.18 c	0.179±142.90	0.069±143.36 ab
T4	0.461±208.150	0.063±206.25 c	0.014±299.13	0.014±276.08 c	0.288±142.76	0.040±143.31 b
T5	0.327±207.596	0.049±206.19 c	0.346±300.11	0.057±275.88 c	0.161±142.60	0.046±143.25 B
Sig.	NS	0.05	NS	0.05	NS	0.05

Table (3) indicates the effect of using fermented date stone powder with the Iraqi probiotic instead of barley in the diet on the blood biochemical characteristics of laying hens, the concentration of albumin, globulin and total protein in the blood plasma of birds, as the table shows that there were no significant differences in all these traits when the measurement was made when the laying hens were 43 weeks old, while a significant decrease ($P \leq 0.05$) was observed in total protein, albumin and globulin concentrations, as the significant decrease was in T3, T4 and T5 compared to T1 and T2 treatments, with no significant differences between T1 and T2 on the one hand, and among T3, T4 and T5 treatments on the other hand.

The reason for the decrease in these concentrations and with the increase in the percentage of date seed powder fermented with the Iraqi probiotic may be the replacement of barley in the diet, it leads to a deficiency in the main nutrients related to energy and protein, it may push the birds to rely on energy sources in the body such as sugar and cholesterol and destroy them, it is necessary needs for sustainability, growth and production led to a decrease in the concentrations of these elements in the blood of chickens. In the same direction, birds may resort to destroying proteins in the blood to produce energy as a last step, as the birds were exposed to a shortage of foodstuffs that birds feed on (AL-Husseiny et al., 2021).

Table (3) The effect of using powdered date seeds fermented with the Iraqi probiotic in the diet on albumin, globulin, and total protein during the production weeks (43-54 weeks).

Treatments	Albumin (gm/ 100 ml blood)		Globulin (gm/ 100 ml blood)		Protein (gm/ 100 ml blood)	
	43 weeks	54 weeks	43 weeks	54 weeks	43 weeks	54 weeks
T1	0.008±2.60	0.009±2.24 a	0.016±2.38 b	0.012±2.34 a	0.024±4.64 b	0.020±4.57 a
T2	0.008±2.60	0.016±2.23 a	0.007±2.40 ab	0.013±2.32 a	0.014±4.66 ab	0.002±4.55 a
T3	0.004±2.27	0.007±2.14 b	0.006±2.42 a	0.008±2.26 b	0.010±4.69 ab	0.001±4.40 b
T4	0.005±2.27	0.007±2.10 c	0.011±2.41 ab	0.013±2.25 b	0.017±4.68 ab	0.020±4.35 b
T5	0.001±2.28	0.009±2.13 bc	0.001±2.42 a	0.010±2.23 b	0.002±4.70 a	0.020±4.36 b
Sig.	NS	0.05	NS	0.05	0.05	0.05

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